PROJECT CHARGE: 1706

PROJECT TITLE: TOBACCO PHYSICS

PROJECT LEADER: D. B. Losee

PERIOD COVERED: February 1 - 28, 1983

DATE OF REPORT: March 10, 1983

TOBACCO MINIMIZATION (D. B. Losee, C. O. Tiller, P. A. Wilson)

The possibility of "selectively" cleaving bonds in tobacco carbohydrates through UV irradiation is being explored. If, for example, a percentage of glycosidic bonds could be selectively cleaved in cellulose prior to thermal decomposition, the potential exists for subjective improvement of this material. This concept has been tested by irradiating "as is" Whatman filter paper with 1200 watts of 220-180 nm light for 24 hours. The temperature did not exceed 50°C during this time period. After this irradiation the cellulose has a distinctive aroma, has yellowed (band at 370 nm) and thermally decomposes differently from control cellulose. Interestingly, if the Whatman paper is first saturated with distilled water and then irradiated under identical conditions, it breaks down differently to produce a matrix which has a distinct acetic acid aroma after irradiation. These reactions are unquestionably free radical driven and will be pursued further. A quartz reactor is being designed which will allow a greater percentage of the surface area of cellulose to be exposed to the radiation.

It has been established from Analytical testing that with the use of the appropriate porosity paper it will be possible to design a cigarette with marketplace specifications which can deliver 15 mg of tar from only 300 mg of a tobacco blend. It, of course, remains to be seen if an appropriate filler comprising 700 mg of this cigarette can be found which will not subjectively detract from the product.

As mentioned in previous monthly reports, starch (tobacco "starch") has been considered as a tobacco substitute. Equipment necessary for sheet casting starch has been obtained from Development (Mr. George Burnett) and has been installed in the lab. Several sheets of both starch and pectin have been cast to gain familiarity with the equipment and the techniques required.

The thermal analyses of the white puffed part of popped popcorn and cornstarch have been completed. The EGA/MS data for popcorn are being plotted and interpreted.

Another tobacco substitute that has been investigated is kudzu. The thermal analysis of kudzu under pyrolysis and combustion was completed and compared with bright tobacco. If green kudzu is compared to cured (dried) kudzu, a new exothermic decomposition pathway appears at approximately 420°C. Additionally, kudzu does not display a sugar decomposition peak as

2022203099

Source: https://www.industrydocuments.ucsf.edu/docs/qfkm0000

does bright tobacco. A reduction (or absence) in pectin and hemicellulose decomposition when compared with bright tobacco is also evident.

MECHANISMS OF WET EXPANSION (B. E. Wyamack, K. R. Squire)

EGA/MS runs were completed in the Entrained Flow Reactor on uncased bright filler and water extracted filler. The runs were performed at 650°F in steam. Concentrations were measured at a residence time of ∿ .45 sec. Consistently higher levels of CH_3OH and CO_2 were evolved from the unwashed filler. These results agree with previous tube furnace comparisons of the same tobaccos after 3" tower WET processing.

/ev

D. B. Lowe Jr.

2022203100

Source: https://www.industrydocuments.ucsf.edu/docs/qfkm0000